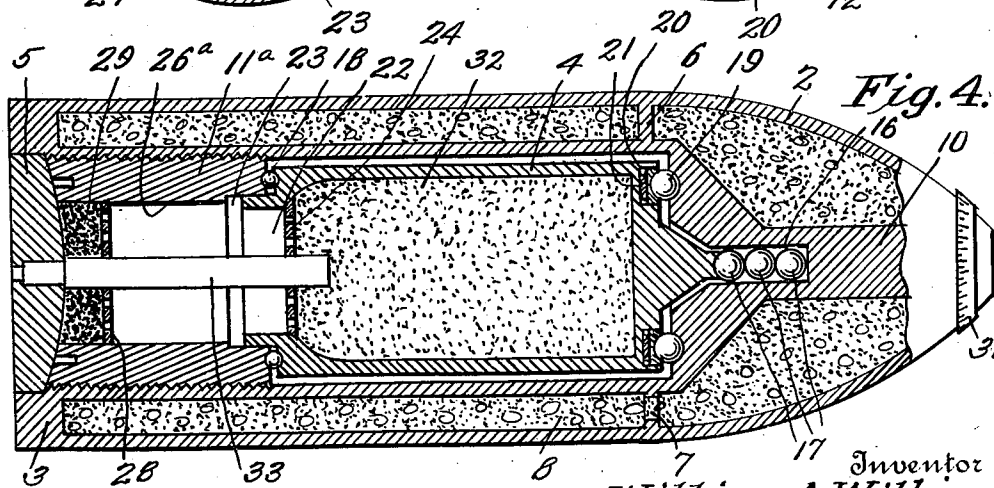
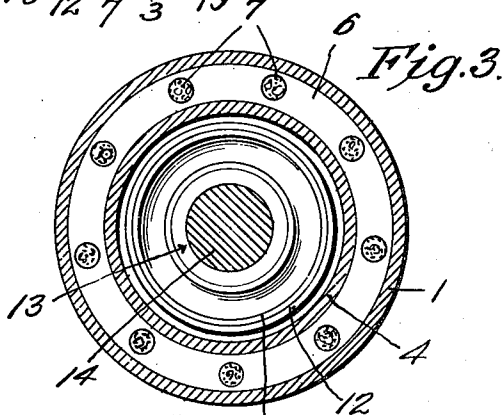
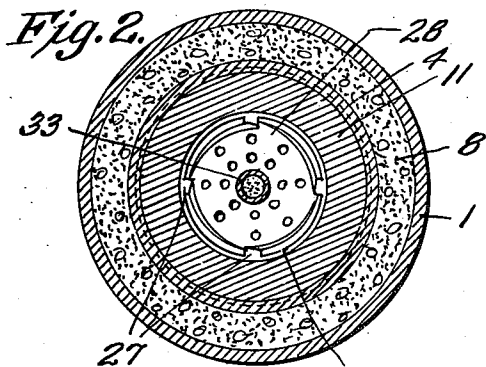
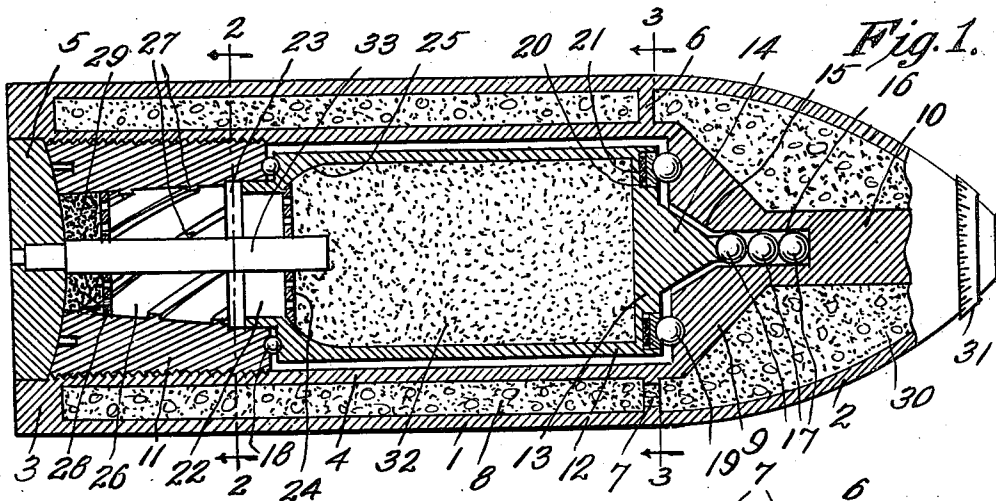


W. A. WILKINS.
PROJECTILE.
APPLICATION FILED JUNE 13, 1918.

1,307,607.

Patented June 24, 1919.



Witnesses

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WILLIE A. WILKINS, OF ORANGE, TEXAS.

PROJECTILE.

1,307,607.

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To all whom it may concern:

Be it known that I, WILLIE A. WILKINS, a citizen of the United States, residing at Orange, in the county of Orange and State of Texas, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

This invention relates to projectiles, and more particularly to an explosive projectile or shell.

One of the main objects of the invention is to provide a shell of the character stated which may be produced at relatively small cost and which is so constructed as to materially increase the effective range thereof. A further object is to provide a shell having means for imparting an additional forwarding impulse thereto shortly after the shell has left the muzzle of the gun from which it is fired. Still another object is to provide means whereby this additional forwarding impulse will be applied at what is commonly termed the dead center of the shell so as to act to best advantage and materially increase the range of the shell by restoring it to proper balance. Another object is to provide means for accelerating the rotation of the shell after it leaves the gun so as to secure greater accuracy. Further objects will appear from the detailed description.

In the drawings:—

Figure 1 is a central longitudinal section through a shell constructed in accordance with my invention.

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a section taken on line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 of a modified form.

In constructing the shell I provide an outer casing 1 of ordinary construction provided with the rounded nose portion 2 and the base 3. This outer or main casing 1 is provided with an inner casing 4 disposed in concentric spaced relation thereto and communicating at its outer end with a central circular opening through the base 3 which is normally closed by a closure disk 5 frictionally secured in the base. At its forward end, inner casing 4 is connected to the outer casing 1 by an annular web 6 provided with a plurality of spaced openings 7 for establishing communication between the space 8 intermediate the two casings and the interior of nose portion 2 of

the shell. The inner casing is also provided, at its forward end, with a substantially frusto-conical head 9 having a central forwardly projecting neck 10 the forward end of which is secured to the nose 2 of the shell. The inner casing is thus secured within the outer casing in spaced relation thereto and is braced in proper position.

An exteriorly threaded sleeve 11 is secured in the base portion of the inner casing 4 which is interiorly threaded for this purpose. This sleeve coöperates with head 9 to form a chamber for an inner container or drum 12. This drum is provided, at the center of its forward end 13 with a forwardly projecting substantially frusto-conical member 14 which projects into a corresponding recess 15 formed at the central portion of head 9 and in direct communication with a bore or recess 16 extending from the inner end of neck 10. This recess receives a plurality of, in this case three, bearing balls 17 which are confined between the neck 10 at the forward end of the recess and the forward end of member 14 which is provided with a frusto-spherical recess to receive the innermost ball. By mounting the drum 12 in this manner, any forward impulse or thrust which may be imparted to the drum will be transmitted to the main casing 1 through balls 17 and neck 10, the force of this thrust being transmitted directly to the shell at the forward portion thereof and along lines extending axially thereof so as to be applied to the very best advantage, this additional force or impulse tending to overcome what is commonly termed the "dead center" of a shell when in motion so as to restore proper balance thereof.

The drum 12 is of less exterior diameter than the interior diameter of inner casing 4 and is disposed in concentric spaced relation thereto. To prevent interference by the drum with the proper rotation of the shell when it is shot from a gun, I provide anti-friction bearings which permit free rotation of the body of the drum about the drum as the central element or core. For this purpose, bearing balls 18 are mounted between the rearward end of the drum and the inner end of sleeve 11, suitable raceways being formed in the inner end of the sleeve and the adjacent end of the drum for the reception of these balls. Between the forward end 15 of the drum and the head 9 of casing 4, are mounted a plurality of bear-

ing balls 19. These balls are operative in race-ways formed in head 9 and in a washer 20 which is mounted in an annular channel provided in the outer face of the forward end of the drum. A ring or gasket 21 of compressible material is mounted in the channel beneath washer 20. Normally this gasket will not be compressed, and the bearing balls 18 and 19 will act to support drum 12 in concentric spaced relation within the inner casing 4, while permitting free rotation of the body of the shell about this drum.

Drum 12 is provided with a rearwardly projecting reduced neck 22 which fits snugly in an annular recess 23 formed in the inner end portion of sleeve 11. The forward end of this neck is normally closed by a perforated disk 24 which is mounted within drum 12. As will be noted more clearly from Fig. 1, the interior of the drum adjacent the neck 23 is slightly curved or arched as at 25 so as to provide an inclined or beveled supporting surface for the edge portion of disk 24 and eliminate all sharp flanges or corners between the body of the drum and the neck thereof. Sleeve 11 is provided with a rearwardly tapering central bore 26, and has its inner portion cut to provide a plurality of helical threads or riflings 27. A perforated disk 28 is mounted within the bore 26 of sleeve 11 in spaced relation to the inner face of closure disk 5 and cooperating therewith to provide a space for the reception of an explosive charge 29.

The main explosive charge designated generally by 30 is contained within nose 2 of the body of the shell and space 8 between the outer main casing 1 and the inner casing 4. This explosive charge may be ignited by means of a timer, or time fuse, 31 which is secured in the forward end of nose 2 of the shell and operates in the well known manner. The explosive charge 32 within drum 12 is ignited by means of a quick burning fuse 33 which is secured in the closure disk 5 of the base and projects into the drum, this fuse being ignited at the time of firing the gun from which the shell is shot.

This shell is intended to be fired from a gun of standard construction the barrel of which is rifled in the well known manner. Shortly after the shell leaves the muzzle of the gun, the explosive charge 32 contained within drum 12 will be ignited. Practically simultaneously with the ignition of the explosive charge 32, explosive charge 29 will be ignited by means of the heat and flame produced by igniting the charge 32. The latter charge 29 is of a much higher explosive than charge 32 so that, explosion of the charge 29 takes place simultaneously with explosion of charge 32 so as to prevent the force of the explosion of the latter charge from being dissipated due to free escape through the sleeve 11. This results

in imparting a decided forward impulse to the drum 12, the compressible gasket 21 being compressed so as to transmit this impulse to the body of the shell by means of the balls 17 and neck 10, the force generated being applied axially of the shell and substantially at the central portion of the nose 2, or at what is commonly termed the "dead center" of the shell. In addition, coincident with this forward impulse of drum 12, the closure disk 5 is blown from the base 3 of the shell so as to permit escape of the gases generated by the explosion of the explosive charges 32 and 29. These gases flowing through the rearwardly tapering bore in sleeve 11 under high pressure and at great velocity will impinge upon the riflings 27 so as to impart rotary movement to the body of the shell, thus accelerating the initial rotation imparted by the riflings of the gun from which the shell is shot. This acceleration in speed of the shell and in rotation will serve to steady the projectile so as to insure greater accuracy and will materially increase the range thereof. Also, the drum 12 acts as a center or core about which the body of the shell rotates at great speed, this drum exerting a steadying effect upon the projectile so as to prevent any wavering thereof during its passage through the air which also serves to materially increase the accuracy and range of the projectile.

In the form illustrated in Fig. 4 of the drawings, the construction of the projectile is the same as that above described with the exception that the central bore 26^a of sleeve 11^a is of uniform diameter, the riflings 27 being omitted. The operation of this form of projectile is the same as that illustrated in Figs. 1, to 3 inclusive, except that the acceleration in rotation of the projectile due to the action of the gases generated by the explosions of the charges 29 and 32 will not occur.

The foregoing description and the drawings have reference to what may be considered the preferred or approved form of invention. It is to be understood, however, that I may make such changes in construction and arrangement and combination of parts, materials, dimensions, etc., as may prove expedient and fall within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a projectile, an outer casing adapted to contain a main explosive charge, and an inner drum mounted in said casing and adapted to retain a supplemental explosive charge, said drum being supported in concentric spaced relation to the disk by anti-friction means so as to permit free rotation of the casing about the drum as a center.

2. In a projectile, a main casing, a drum

mounted within said casing so as to have limited independent forward motion therein, means for igniting an explosive charge carried by said drum after the projectile has been fired from a drum so as to impart a forward impulse to the drum, and means for transmitting the impulse imparted to the drum to the body of the projectile at substantially the dead center thereof.

3. In a projectile, a main casing, a drum mounted within said casing in concentric spaced relation thereto and adapted to contain an explosive charge, said drum being mounted for limited independent forward movement, means for transmitting the forward movement of the drum to said main casing, means for igniting an explosive charge within the drum after the projectile has been shot from a gun, and means adapted to be acted upon by the gases generated by the explosion of a charge carried by said gun for imparting rotary motion to the projectile.

4. In a projectile, an outer casing, the drum mounted within said casing in concentric spaced relation thereto, anti-friction bearings for supporting said drum and for permitting free rotation of the outer casing about the drum as a center, said drum being provided with a rearwardly projecting neck and being adapted to contain an explosive charge, the casing being provided at its base portion with a central bore communicating with the neck of the drum to permit escape of gases generated by the explosion of an explosive charge carried within the drum, a closure disk frictionally secured in the base of said drum and acting to normally close the outer end of said bore, and a fuse carried by the closure disk and adapted to be ignited by the explosive charge for firing the projectile from a gun, said fuse communicating with the interior of the drum.

5. In a projectile, an outer casing, the drum mounted within said casing in concentric spaced relation thereto, anti-friction bearings for supporting said drum and for permitting free rotation of the outer casing about the drum as a center, said drum being provided with a rearwardly projecting neck and being adapted to contain an explosive charge, the casing being provided at its base portion with a central bore communicating with the neck of the drum to permit escape of gases generated by the explosion of an explosive charge carried within the drum, a closure disk frictionally secured in the base of said drum and acting to normally close the outer end of said bore, a fuse carried by the closure disk and adapted to be ignited by the explosive charge for firing the projectile from a gun, said fuse communicating with the interior of the drum and means carried by the outer casing and adapted to be acted upon by gases escaping through the

bore thereof to impart rotation to said casing.

6. In a projectile, a main casing, an inner casing carried thereby, a sleeve secured in the rearward end of said inner casing and provided with a central bore, a drum mounted within the inner casing and adapted to contain an explosive charge, said drum being provided with a rearwardly projecting neck extending into the bore of said sleeve, anti-friction bearings interposed between the end of the drum and the inner end of said sleeve and the forward end of the inner casing and acting to support the drum in concentric spaced relation to the inner casing while permitting free rotation of said inner and outer casings about the drum as a center, a closure disk frictionally secured in the base of the outer casing and acting to normally close the outer end of said sleeve, and a fuse communicating with the interior of the drum for igniting an explosive charge carried thereby and adapted to be ignited by an explosive charge for firing the shell from a gun.

7. In a projectile, a main casing, an inner casing carried thereby, a sleeve secured in the rearward end of said inner casing and provided with a central bore, said sleeve being provided on its inner surface with riflings, a drum mounted within the inner casing and adapted to contain an explosive charge, said drum being provided with a rearwardly projecting neck extending into the bore of said sleeve, anti-friction bearings interposed between the end of the drum and the inner end of said sleeve and the forward end of the inner casing and acting to support the drum in concentric spaced relation to the inner casing while permitting free rotation of said inner and outer casings about the drum as a center, a closure disk frictionally secured in the base of the outer casing and acting to normally close the outer end of said sleeve, and a fuse communicating with the interior of the drum for igniting an explosive charge carried thereby and adapted to be ignited by an explosive charge for firing the shell from a gun.

8. In a projectile, a main casing, an inner casing carried thereby, a sleeve secured in the rearward end of said inner casing and provided with a central rearwardly tapering bore, said sleeve being provided on its inner surface with riflings, a drum mounted within the inner casing and adapted to contain an explosive charge, said drum being provided with a rearwardly projecting neck extending into the bore of said sleeve, anti-friction bearings interposed between the end of the drum and the inner end of said sleeve and the forward end of the inner casing and acting to support the drum in concentric spaced relation to the inner casing while permitting free rotation of said inner and outer

casings about the drum as a center, a closure disk frictionally secured in the base of the outer casing and acting to normally close the outer end of said sleeve, and a fuse communicating with the interior of the drum for igniting an explosive charge carried thereby and adapted to be ignited by an explosive charge for firing the shell from a gun.

9. In a projectile, a main casing, an inner casing carried thereby in concentric spaced relation to said main casing, said inner casing being provided at its forward end with a forwardly projecting head provided with a forwardly projecting neck secured to the nose of the main casing, a sleeve secured in the rearward end portion of the inner casing and provided with riflings on its inner face, a closure disk frictionally secured in the base of the main casing and acting to normally close the outer end of said sleeve, a drum mounted within the inner casing in concentric spaced relation thereto, said drum being provided at the center of its forward end with a forwardly projecting member and at the central portion of its rearward end with a rearwardly projecting sleeve extending into the inner end portion of the

sleeve carried by the inner casing, ball bearings interposed between the ends of said drum and the inner end of said sleeve and the forward end of the inner casing, a compressible gasket being interposed between the forward end of the drum and the ball bearings therefor so as to permit independent movement of the drum forwardly of the casing, balls interposed between the forwardly projecting member at the center of the forward end of the drum and the neck carried by the head of the inner casing and acting to transmit forward impulse which is imparted to the drum to the main casing, a perforated disk mounted in the rearward end of the drum so as to confine an explosive charge therein, a perforated disk mounted in said sleeve in advance of the closure disk in the base of the drum so as to provide a space for receiving an explosive charge, and a fuse carried by said closure disk and adapted to be ignited when the projectile is fired from a gun, said fuse extending into the drum so as to ignite an explosive charge carried thereby.

In testimony whereof I affix my signature.
WILLIE A. WILKINS.